Naval Health Research Center *San Diego, CA*

NHRC UPDATE

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NHRC Researchers Examine the Use of Nutritional Supplements

There is a common belief among many athletes and military personnel that nutritional supplements enhance performance. Several studies have reported a high frequency of nutritional supplement use among athletes, and some nutritional

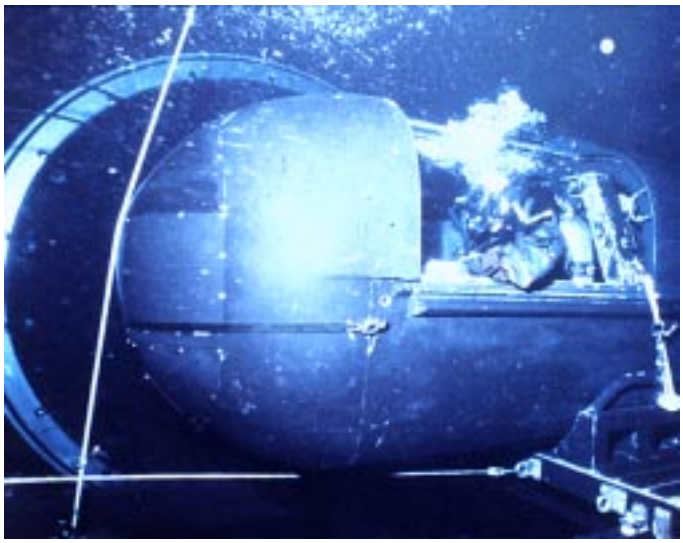
Over-the-counter nutritional supplements

supplements have been shown to increase various components of fitness and athletic performance. Unfortunately, there is little scientific evidence that many of the currently popular nutritional supplements do enhance physical performance, and, as with nearly any substance, misuse of these products can have deleterious effects. In many cases, the long-term effects of nutritional supplement use are unknown.

The Food and Drug Administration (FDA) does not evaluate the safety of nutritional supplements in the same way it evaluates drugs, except when adverse effects are reported. Such is the case with ephedrine, a supplement derived from the herb Ephedra equisetina or Ma-huang. Recently, in response to several cases of serious illness (e.g., seizures, heart attacks, and strokes) and death associated with use of this product, the FDA proposed new guidelines for ephedrine use. The proposal would limit the amount of ephedrine in supplements, the number of servings per day, and require a label warning not to use the product for more than 7 days. The FDA also has proposed a ban on the combination of ephedrine with substances that have similar effects, such as caffeine. Recently, a Navy Master Diver suffered a stroke after consuming two doses of a nutritional supplement containing both ephedrine and caffeine. Attending physicians believed that product played a major role in the occurrence of the stroke.

U.S. Navy Sea-Air-Land (SEAL) personnel are often compared with competitive athletes because of the rigorous physical training regimens in which they engage. As Dr. Prusaczyk and his colleagues at NHRC noted in a recent publication titled "Physical Demands of U.S. Navy Sea-Air-Land (SEAL) Operations" SEALs seek any competitive advantage to achieve the high level of fitness needed to meet their demanding mission requirements. Anecdotal evidence suggests that nutritional supplement use by SEALs is very common. In 1997, a team of NHRC researchers, including Ms. Kevin Schneider, Ms. Linda Hervig, and Dr. Hal Goforth, constructed and administered the most comprehensive survey conducted to date documenting supplement use among military personnel. The survey was designed to assess the type and frequency of supplement use, expected benefits, adverse effects experienced, cost, and satisfaction of use among West Coast SEALs. For the purpose of the survey, a nutritional supplement was defined as anything consumed that is not (1) a food that is part of the regular diet; (2) medications for the treatment of an illness, disease, or injury; or (3) alcohol, coffee, or tea. The data collected during this survey were reported at the 1998 Annual Meeting of the American College of Sports Medicine in Orlando, FL.

Seventy-eight percent of the SEALs in the study reported taking at least one nutritional supplement during the past year. The majority reported taking supplements purported to increase muscle mass, strength, and/or power, and provide a source of energy. Multiple supplement use was common, with 66% using three or more supplements. Of the individuals who used supplements, 44% reported spending at least $25 each month for them.



SEAL Delivery Vehicle disembarking Dry Deck Shelter

Only 57% of the individuals taking supplements to enhance muscle mass and power reported experiencing these effects, and most were only "slightly satisfied" with these supplements. In addition to the purported benefits for a given supplement, there were other negative effects such as nausea, diarrhea, stomach cramps, and other gastrointestinal problems. Because many supplements contain a combination of ingredients and many respondents take more than one supplement, it is possible they are unable to distinguish which of the components produced the noted effect.

These adverse effects have been reported to be associated with high consumption of protein powders, amino acids, and steroid alternatives. In this survey, only 6% of the SEALs reported taking a supplement containing ephedrine and 14% reported using at least one product containing a combination of ephedrine and caffeine.

One of the more revealing findings of the study was related to product information. When asked for their sources of information on supplements, these SEALs reported getting information from friends (79%), team members (63%), and magazines (49%). Only 24% reported receiving information about supplements from a health care provider. This finding suggests that the Navy medical community should take a proactive role in providing accurate scientific information on the risks and benefits that can occur with nutritional supplement use. Therefor, NHRC researchers are actively involved in developing educational and training modules designed to further educate the medical community as well as sailors and marines on the use of nutritional supplements.

NHRC Scientists Assess Physical Disability Separations and Workers' Compensation Costs

Between 1989 and 1995 the cost of physical disability separations from the Marine Corps increased from $10 million to $28 million. This increase of nearly 300% prompted the Marine Corps to request the assistance of NHRC researchers to identify physical disabilities leading to severance pay separations within the Marine Corps and to propose solutions to reduce potential disabilities. In response to this request, Dr. Frank Garland, in collaboration with Ms. Sharon Tossey, initiated a complex integration of data to identify trends in severance pay separations and provide policy recommendations. These data were retrieved from the Physical Evaluation Tracking System (maintained by the Navy Physical Evaluation Board), the Career History Archival Medical and Personnel System (maintained by NHRC), and the Defense Eligibility Enrollment Reporting System (maintained by DoD). During the study time frame of 1993 to 1996, these investigators identified 7,040 Marine Corps personnel and 8,417 Navy personnel who had received a physical disability separation.

The overall incidence rate of physical disability separation per 100,000 person-years was 1,622, or about 2% of all personnel per year. However, there was a statistically significant decline in severance pay separations between FY94 and FY96. The leading causes of physical disability separation were primarily musculoskeletal problems, such as joint pain (leg or ankle), lower back pain, arthritis, and asthma. The highest rate of severance pay separations was among ages 17 to 24, and Marine Corps personnel serving in their first year were at greater risk of separating compared with all other lengths of service. The greatest risk of severance pay separation was in the most junior enlisted paygrade (E1), and in one of the most senior officer ranks (O6). Although the rate of women separating with severance pay was much higher than men, women represented a relatively small percentage of all severance pay separations in the study. In addition, the gender-specific rate was more than double for both men and women Marines in comparison with Navy personnel.

Another area of high cost for the Navy involves workers' compensation for lost time due to occupational illness or injury. The majority of the lost time of the Navy civilian work force is due to injuries. In a previous study supported by the Office of Naval Research and published in the Journal of Occupational and Environmental Medicine, NHRC researchers Dr. Steve Shepherd and Ms. Bonnie LaFleur found that there were more than 11,000 injury-related lost-time claims among Navy civilians each year. Interestingly, these researchers found that a disproportionately high percentage of claims for sprains and strains were filed on Mondays, while the number of other injuries, such as contusions, fractures, and lacerations, was evenly distributed across all days of the work week. These Monday claims exceeded the number from other days of the week by 22%, and they were believed to include many injuries that were suffered on the weekend but were claimed by employees as work-related. In addition, persons filing claims for Monday-occurring sprains and strains were, in some respects, significantly different from claimants whose injuries occurred later in the week. In general, claimants for Monday-occurring sprains and strains were more likely to be a supervisor, to report an injury in the back or trunk, and not a college graduate.

It is estimated that the average cost to the Navy for a lost-time injury accepted for coverage by the Office of Workers' Compensation Program is approximately $22,000. The authors concluded that if 22% of the Monday claims were unwarranted, then claims unrelated to safety conditions at Navy facilities generated costs and future liabilities in excess of $38 million during the 5-year sampling period of this study. Based on these data, the authors developed criteria to assist claims adjusters in conducting a more stringent review of those claims that are possibly fraudulent.

Navy industrial facility

As the Navy and Marine Corps continue to meet expanding operational requirements with limited personnel and resources, it becomes increasingly necessary to identify and eliminate inefficiencies. The research capabilities at NHRC represent an important component in the strategy to optimize resources in a period of fiscal constraint.

NHRC Researchers Explore Shipboard Telemedicine Opportunities

Generally defined, telemedicine is the use of communications technologies to support medical care at a remote location. These technologies can be used to provide immediate and expert health care of the highest quality to an individual anywhere in the world. Given its global mission, it is

not surprising that the U.S. military is a widely acknowledged leader in many aspects of telemedicine. In 1983, Dr. Steve Nice of NHRC conducted a 9-month study of all U.S. Navy surface ships, Pacific Fleet submarines, and all ships of the Military Sealift Command to determine the need for telemedicine capabilities aboard ship. This study showed that in 28% of all medical evacuations (medevacs), there was a significant probability that the medevac could have been prevented if the ship had had the capability to transmit medical data via telecommunications. Fourteen years later, in 1997, this estimate (28%) was replicated in an independent study by the Center for Naval Analysis, Alexandria, VA.

In recent years, the Navy has implemented telemedicine aboard several aircraft carriers, and researchers at NHRC are executing a planned series of studies to determine whether telecommunications between shipboard health care providers and shore-based medical consultants and specialists were effective in supporting diagnosis and treatment during medical visits. Dr. Jerry Larson of NHRC is examining the telemedicine process aboard the aircraft carriers USS GEORGE WASHINGTON (CVN-73), USS ENTERPRISE (CVN-65), and USS THEODORE ROOSEVELT (CVN-71), as well as McMurdo Station, Antarctica, to determine the impact of telemedicine on the initial diagnosis, treatment plan, and disposition of the patient. The NHRC telemedicine research team also includes Mr. Ralph Burr, Ms. Dee Pearsall, and, until recently, Dr. John Silva. Preliminary results suggest that the primary impact of telemedicine aboard aircraft carriers will be on the development of treatment plans rather than on diagnosis or patient disposition. The most frequent type of data or information transmissions involved still images, followed by conversation, and live images (televideo). Dermatology, orthopedics, radiology, ear/nose/throat, and urology were the five leading specialist groups consulted, and the majority of the consultations (84%) were rated as very effective.

Currently, NHRC is leading the test and evaluation component of a proposed joint-service Advanced Concepts Technology Demonstration (ACTD). The ACTD will demonstrate and evaluate new information technologies (including telemedicine) during planning and execution of joint medical operations. Dr. Larson and Mr. William Pugh are working with representatives from other Navy commands and the other services to define measures of effectiveness so that the costs and benefits of theatre telemedicine capabilities can be quantified. Thus, the ACTD will provide an opportunity to combine current work on shipboard telemedicine with research in the context of joint Army, Navy, Marine Corps, and Air Force medical operations.

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